Hydrol. Earth Syst. Sci. Discuss., 11, C677–C679, 2014
www.hydrol-earth-syst-sci-discuss.net/11/C677/2014/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Historical land-use induced evapotranspiration changes estimated from present-day observations and reconstructed land-cover maps" *by* J. P. Boisier et al.

Anonymous Referee #1

Received and published: 27 March 2014

General comments

The paper fills a niche, as it sorts out uncertainties regarding (seasonal) effects of past global land cover change on evapotranspiration. This is a major step forward compared to earlier approaches based on single models or data sets. I have some (minor) comments for clarification.

Specific comments

Given the different models and data sets involved, the text and the method is a bit hard to follow at places. I think it would be helpful to have an overview scheme (flowchart)

that shows what LULCC patterns were used for what model (I understand that they differed among models?), and with what data sets these results were then combined (i.e. the ET and vegetation products listed in table 1). Also, it is not clear how the vegetation maps mentioned on p. 2055 (from 1870 and 1992) relate to those mentioned in section 2.2 - are those from 1992 the same?

It is not clear to me whether (some of) the models used do compute feedbacks of LULCC to climate. Fig. 4 suggests so, as pronounced changes occur also in regions where there was no major LULCC (northern Australia, parts of South America, southeastern USA)? If such feedbacks are considered, this seems to be a significant progress compared to earlier studies cited (e.g. Gordon et al.) and should be highlighted, providing a bit more detail on the (coupled) models used. If not, its omission should be discussed.

Any chance to say something about individual ET components (transpiration, evaporation, interception)? Certainly to be left for future studies, but worth mentioning; see. e.g. a paper by Murray et al. on global interception trends, in Ecohydrology 2014. There are also other papers on LULCC effects on global ET, such as by Rost et al. Adv. Geosci., 18, 43-50, 2008l.

Page 2056: What LULCC data underlie the JSBACH and TESSEL models?

Gordon et al. paper: sometimes it is said they don't include vegetation, sometimes it is said otherwise, please clarify. And is it really a data-based study (global ET data aren't available)?

Page 2060, "Considering irrigation...": How do you conclude that with irrigation your estimate would be between 400 and 3500 km3? The irrigation issue needs to be sorted out more properly. Maybe there are some more studies worth a citation, which looked at global (macro-scale) irrigation effects on ET.

The paper would benefit from a small paragraph trying to explain why ET in-

creases/decreases due to LULCC (i.e. what are the likely processes - pointing to the need for studying these in more detail in future publications).

Technical comments

There are a few typos.

Table 1: place the variables used in an extra column.

Fig. 1b: Mention in the legend what red and blue mean. The paper uses some non-conventional methods/statistics so any supporting explanation of the figures is helpful.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 2045, 2014.